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PANZERKAMPFWAGEN V PANTHER

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View of a later production Panther Ausf D (the Ausf D proper) which was known as the D₄.

(Chamberlain Collection)

Panzerkampfwagen V Panther

By Chris Ellis and Peter Chamberlain

"NUMEROUS Russian T-34s went into action and inflicted heavy losses on the German tanks at Mzensk in 1941. Up to this time we had enjoyed tank superiority, but from now on the situation was reversed. The prospect of rapid decisive victories was fading in consequence. I made a report on this situation, which was for us a new one, and sent it to the Army Group; in this report I described in plain terms the marked superiority of the T-34 to our PzKpfw IV and drew the relevant conclusion as that must affect our future tank production. I concluded by urging a commission be sent immediately to my sector of the front, and that it consist of representatives of the Army Ordnance, the Armaments Ministry, the tank designers, and the firms that built tanks. If this commission was on the spot it could not only examine the destroyed tanks on the battlefield, but could also be advised by the men who had used them as to what should be included in

the design for our new tanks. I also requested the rapid production of a heavy anti-tank gun with sufficient penetrating power to knock out the T-34. The commission appeared on the Second Panzer Army's front on November 20, 1941".

General Heinz Guderian, in his book *Panzer Leader*.

The Panther that never was; a wooden project model of the VK.3002(DB) prototype which was abandoned in favour of the MAN design. Its close resemblance to the T-34 is obvious but as finalized the VK.3002(DB) was to have twin wheels like the T-34 rather than the interleaved wheels shown.

(Chamberlain Collection)

THE sudden decline in German panzer fortunes brought about by the unexpected appearance of the revolutionary T-34 tank in Soviet hands, jolted the German Army Staff out of a complacency which had been caused entirely by the excellence and versatility of the PzKpfw IV. Work on a successor to the PzKpfw IV had started as early as 1937 when the firm of Henschel and others had been asked to produce designs in the 30-35 ton class. However, progress on these was slow, due partly to changing ideas and requirements. By 1941, prototypes by Henschel, VK.3001(H), and Porsche, VK.3001(P), had been completed but, at the time of the invasion of Russia, when the T-34 was met, requirements were changed yet again in favour of a larger design with a 8.8 cm. gun in the 45 ton class, the VK.4501. This eventually became the Tiger heavy tank, whose development is described separately in this Series. Because the VK.4501 design was needed urgently, however, it largely incorporated features from the earlier development prototypes and the Tiger thus owed nothing to the T-34 design. The 8.8 cm. gun and the heavy (100 mm.) armour specified for the VK.4501 design were, however, influenced by the T-34's appearance for it was considered essential to have a tank with these features in production as a safeguard against any eventual Soviet development of an up-gunned and up-armoured version of the T-34.



Cover Photograph: A Panther Ausf A captured by the Russians advances into action against its former owners, boldly marked with white stars for recognition purposes. The Soviet Army had complete tank companies equipped with captured Panthers. (IWM)



One of the uncompleted VK.3002(DB) prototypes. Unlike the T-34, this vehicle had return rollers. Resemblance to the T-34 is particularly striking in this front view.

(Chamberlain Collection)

Meanwhile, as Guderian recounts, the commission appointed by the Armaments Ministry acted swiftly. They made an "on the spot" investigation on November 20, 1941, to assess the key features of the T-34 design. The three main characteristics of this vehicle which rendered all existing German tanks technically obsolete were (1) the sloped armour which gave optimum shot deflection all round (2) the large road wheels which gave a stable and steady ride, and (3) the overhanging gun, a feature previously avoided by the Germans as impracticable. Of these the first was the most revolutionary. The Armaments Ministry acted promptly and on November 25, 1941, contracted with two principal armament firms, Daimler-Benz and MAN, to produce designs for a new medium tank in the 30-35 ton class, under the ordnance designation VK.3002. To be ready the following spring, the specifications called for a vehicle with 60 mm. frontal armour and 40 mm. side armour, the front and sides to be sloped as in the T-34. A maximum speed of 55 km. per hour was to be achieved.

In April 1942, the two designs, VK.3002 (DB)—DB: Daimler-Benz—and VK.3002 (MAN), were submitted to a committee of *Waffenprüfamt 6*, the section of the Army Weapons Department (*Heeres-*



One of the first 20 Panthers produced, originally designated Ausf A, later classed as Ausf D, and known as the D₁. Major distinguishing feature is the cupola protruding through the turret side, but the single baffle muzzle brake and smoke dischargers on the turret side are other early features to note.

(IWM)

waffenamt) responsible for AFV design and procurement. The designs afforded an interesting contrast. The Daimler-Benz proposal was an almost unashamed copy of the T-34 in layout, with the addition of a few typical teutonic refinements. It had a hull shape similar to the T-34's with turret mounted well forward, so far forward in fact that the driver sat within the turret cage, with remote control hydraulic steering. A MB507 diesel engine was fitted with transmission to the rear sprockets again exactly duplicating the T-34 layout. Paired steel bogies (without rubber tyres) were suspended by leaf springs, and other features included escape hatches in the hull sides and jettisonable fuel tanks on the hull rear in the T-34 fashion. The VK.3002 (DB) was in fact a remarkably "clean" design with much potential. Leaf springs, for example, were cheaper and easier to produce than torsion bars, and the use of all-steel wheels recognized the problem of rubber shortage from the start. The compact engine and transmission at the rear left the fighting compartment unencumbered for future up-gunning or structural change, while the diesel engine itself would have been an advantage in later years when petrol supply became acutely restricted.

By comparison, the VK.3002 (MAN) displayed

An early production Panther Ausf D with single baffle muzzle brake and smoke dischargers on turret side.

(Chamberlain Collection)





Late production Panther Ds had the improved pattern cupola with periscopes and MG ring. It was also fitted retrospectively to some earlier models. This Ausf D, knocked out in Italy in 1944, also has Zimmerit anti-magnetic coating and side skirts. A 75mm shell can be seen on the glacis plate. (IWM)

original German (rather than Russian) thinking; it was sophisticated rather than simple. It had a higher, wider hull than either the VK.3002 (DB) or the T-34, with a large turret placed well back to offset as much as possible the overhang of the long 7.5 cm. gun which was called for as the main armament. Torsion bar suspension was used with interleaved road wheels, while a Maybach HL 210 petrol (gasoline) V-12 engine was proposed, with drive to the front sprockets. The internal layout followed conventional German practice with stations for the driver and hull gunner/wireless operator in the front compartment.

Hitler always took a personal interest in AFV design and was on several occasions instrumental in ordering policy changes or design improvements. When the respective Daimler-Benz and MAN designs were submitted to the Waffenprüfam 6 committee in April 1942, Hitler was most impressed with the Daimler-Benz "T-34 type" proposal, though he suggested that the gun be changed from the 7.5 cm. L/48 model to the longer and more powerful L/70 weapon. Hitler's intervention in the proceedings at this stage led to an order for 200 VK.3002 (DB) vehicles being placed, and prototypes actually went into production. However, the committee set up by Waffenprüfam 6—which was already being called unofficially the "Panther Committee"—preferred the VK.3002 (MAN) design, because it was far more conventional by existing German engineering standards. MAN's proposal was accepted in May 1942 and they were asked to go ahead and produce a mild steel prototype as fast as possible. Subsequently, later in 1942, the order for the 200 Daimler-Benz vehicles was discreetly rescinded.

Meanwhile Ing. Kniepkampf, chief engineer and designer of Waffenprüfam 6, took personal charge of detail design work on the MAN vehicle. This reflected the priority given to the Panther project. Kniepkampf was a key figure in German AFV design at this time, having been with Waffenprüfam 6 since 1936 and remaining as chief engineer almost until the war's end in 1945. Among other things he was principally



Panther Ausf A had a ball mount for the hull machine-gun and the later type of cupola which featured a ring mount for an AA machine-gun. (IWM)

responsible for German half-track development and introduced features like interleaved road wheels, torsion bar suspension, and the Maybach-Olvar gearbox to German tanks.

In September 1942 the first pilot model of the VK.3002(MAN) was completed and tested in the MAN factory grounds at Nuremburg. This was closely followed by the second pilot model which was transported to the Heereswaffenamt test ground at Kummersdorf for official army trials. By this time, incidentally, the Tiger was already just in production, but its shortcomings—including excessive weight, low

The Panther Ausf A showing its later pattern cupola. Note that all turret side openings are deleted except for the rear escape hatch. (IWM)





A close view of the cupola in the Panther Ausf A, showing the armoured periscopes (one has been shot away), the gun ring, and the horizontally opening hatch. (IWM)



Inside the Panther turret, showing loader's seat (right) and the elevating and traversing handwheels (left, centre). (IWM)

speed, and poor ballistic shape—were already recognized. The new vehicle was ordered into immediate production as the PzKpfw V Panther, under the ordnance designation Sd Kfz 171, with absolute top priority rating. The first vehicle was turned out by MAN in November 1942. It was planned to build at a rate of 250 vehicles a month as soon as possible, but at the end of 1942 this target was increased to 600 a month. To reach such an ambitious target it was necessary to form a large Panther production group. Daimler-Benz were quickly switched from work on their now-discarded design (prototypes of which had by then been almost completed) and in November 1942 they, too, began tooling up to build Panthers, the first vehicles coming from Daimler early in 1943. Also in January 1943, Maschinenfabrik Niedersachsen of Hanover, and Henschel, began tooling up to build Panthers—production started in February/March—and scores of sub-contractors were soon involved in what became one of the most concentrated German armaments programmes of the war. In fact, even aircraft production was cut back, partly to conserve fuel for use in tanks but partly, also, to free manufacturing facilities for Panther engines and components.

The monthly target of 600 vehicles was never achieved, however. By May 1943 output had reached a total of 324 completed vehicles and the monthly production average over the year was 154. In 1944 a monthly production average of 330 vehicles was achieved. By February 1945, when production tailed off, 4,814 Panthers had been built. Panthers were first used in action in the great Kursk Offensive of July 5, 1943, but the haste with which the design had been evolved, and the speed with which it had been put into production led to many "teething" troubles. In particular the complicated track and suspension gave trouble, with frequent breakages, while the engine presented cooling problems and this led to frequent engine fires. In the early months of service, indeed, more Panthers were put out of service by mechanical faults than by Soviet anti-tank guns. There were three basic production models of the Panther, Ausführung D, A, and G, in that order. The differences between them are explained later.

THE PANTHER DESCRIBED

The Panther conformed to the usual layout of German tanks. It had the driving and transmission compartment forward, the fighting compartment and turret in the centre, and the engine compartment at the rear. The driver sat on the left hand side forward with a vision port in front of him in the glacis plate. This was fitted with a laminated glass screen and had

Unlike the roughly made T-34, the Panther was a sophisticated design demanding high precision engineering. This official German picture shows Panthers being assembled. (IWM)



an armoured hinged flap on the outside which was closed under combat conditions. Forward vision was then given by two fixed episcopes in the compartment roof, one facing directly forward while the other faced half left in the "10.30" position. This restricted vision considerably and in the later Ausf G a rotating periscope was fitted in place of the fixed forward episcopes, and the half left episcopes and the vision port were completely dispensed with. The Ausf G was thus easily recognized from the front since it had an unpierced glacis plate. The wireless operator, who was also the hull machine-gunner, sat on the right side forward. In the early Ausf D models, he was provided with a vertical opening flap in the glacis plate—rather similar to a vertical letterbox flap—through which he fired a standard MG 34 machine-gun in action. In the Ausf A and G, however, this arrangement was replaced by an integral ball-mount which took the MG 34 in the standard type of tank mounting.* The radio equipment was fitted to the operator/gunner's right and was located in the sponson which overhung the tracks. Episcopes were fitted, duplicating the driver's side.

Between the driver and wireless operator was located the gearbox, with final drive led each side to the front sprockets. The gearbox was specially evolved for the Panther as this vehicle was bulkier and heavier than previous designs and developed considerably more power. Known as the AK 7-200, the gearbox was an all syncromesh unit with seven speeds. Argus hydraulic disc brakes were used for steering in the conventional manner by braking the tracks. However, the epicyclic gears could also be used to assist steering

* The difference in the glacis plate between the Ausf G and Ausf A is clearly shown in the top and left centre illustrations on the left colour plate.

by driving one or other of the sprockets against the main drive, so retarding the track on that side and allowing sharper radius turns.

In the turret the gunner sat on the left hand side of the gun and was originally provided with an articulated binocular sight; this was later changed to a monocular sight. He fired the gun electrically by a trigger fitted on the elevating handwheel. The co-axial machine-gun, fitted in the mantlet, was fired by the gunner from a foot switch. Traverse was by hydraulic power or hand, the same handwheel being used for either method.

The vehicle commander's station was at the left rear of the turret, the offset location being necessitated by the length of the breech which virtually divided the turret into two. A prominent cupola was provided which was of the "dustbin" type with six vision slits in the Ausf D. In the Panther Ausf A and G, however, an improved cupola was fitted which had seven equally-spaced periscopes. This had a hatch which lifted and opened horizontally. Above the cupola was fitted a ring mount for a MG 34 which could be used for air defence, though this mount was sometimes removed.

The remaining crew member was the loader who occupied the right side of the turret. The turret itself had sloped walls and a rounded front covered by a curved cast mantlet. The cage had a full floor which rotated with the turret. Drive for the hydraulic traverse was taken through the centre of the floor to a gearbox, and thence to an oil motor. Turret openings were kept to a minimum and included a large circular hatch on the rear face which was an access/escape hatch for the loader and was also used for ammunition. On the left side beneath the cupola was a circular hatch for ejecting expended cartridge cases

Below and Following Page: The Panther Ausf G, the final production type, had several improvements. Notable is the simplified hull shape with a continuous sloping line to the lower sponson edges, the deletion of the driver's vision ports and episcopes, and the substitution of a rotating periscope, clearly seen in the top view. This view also shows the aperture for the bomb thrower in the turret roof, fitted in place of the smoke dischargers carried in the Ausf D. (IWM)



and re-ammunitioning, but this was eliminated in the Ausf A and G. Similarly eliminated were three small pistol ports, one in each face, which were normally plugged by a steel bung and chain.

The engine, housed in the rear compartment, was a Maybach HL 230 P30, a V-12 23 litres unit of 700 h.p. at 3,000 r.p.m. This was a bored out version of the HL 210 engine originally planned. The earliest production vehicles had this unit, but like most AFV designs, the Panther had increased in weight considerably during the development stage with a heavier gun and heavier armour (among other things) bringing its weight up from the 35 tons originally envisaged to about 43 (metric) tons. The easy way to increase the power to compensate for the added weight was to enlarge the engine. Access to the engine for maintenance was via a large inspection hatch in the centre of the rear decking. Cooling grilles and fans occupied most of the remainder of the rear decking. Exhaust was taken away through manifolds on the squared off hull rear. Most Panthers had stowage boxes flanking the rear exhaust pipes, but these were not always fitted.

The actual hull and superstructure was a single built-up unit of machinable quality homogeneous armour plate of welded construction but with all main edges strengthened by mortised interlocking. The heaviest armour, 80 mm., was on the glacis plate which was sloped at 33° to the horizontal, an angle specifically selected to deflect shells striking the glacis upwards clear of the mantlet.

The suspension consisted of eight double interleaved bogie wheels on each side, the wheels being dished discs with solid rubber tyres. Some very late production vehicles, however, had all-steel wheels of the type fitted to the Tiger II (Royal Tiger), as described later. The first, third, fifth, and seventh wheels from the front were double while the intervening axles carried spaced wheels overlapping the others on the inside and outside. Each bogie axle was joined by a radius arm to a torsion bar coupled in series to a second bar laying parallel to it. The torsion



bars were carried across the floor and the bogie wheels on the right hand side of the vehicle were set behind their respective torsion bars while those on the left were set in front. Thus the wheel layout was not symmetrical. Though this suspension was technically advanced and gave the vehicle superb flotation, maintenance was complicated due to the size of the wheels and consequent inaccessibility of the axles and torsion bars. In addition wheel replacement was a heavy and lengthy task.

The 7.5 cm. L/70 gun mounted in the Panther was developed by Rheinmetall-Borsig who had been asked in July 1941 to design a high velocity version of the 7.5 cm. weapon which could penetrate 140 mm. of armour plate at 1,000 metres. Soon after this the firm were asked to design the turret and mount to hold this gun for installation in the VK.3002 design. The prototype gun was ready in early 1942, a weapon 60 calibres long. Test firing indicated that performance was a little below the requested minimum, so the barrel was lengthened to 70 calibres, the improved



prototype being ready for tests in June 1942. In this lengthened form the gun went into production. Initially it had a single baffle muzzle brake—and was so used on the earliest Panthers—but later a double baffle muzzle brake was adopted.

PANTHER PRODUCTION MODELS

The first Panther models which came off the MAN line from November 1942 were designated in standard German fashion as PzKpfw V Ausf A. The designation PzKpfw V Ausf B was earmarked for a proposed version of the vehicle which was to have the Maybach-Olvar gearbox in place of the specially developed AK 7-200 unit. However, the Maybach gearbox was considered unsuitable for installation in the Panther and the Ausf B never materialized. The first twenty Panthers which originally had the Ausf A designation were really "pre-production" vehicles in modern terms. They had the 60 mm. thick front armour as originally called for, the Maybach HL 210 engine, also as originally specified, a ZF 7 gearbox with clutch and brake steering, the earliest form of the L/70 gun, and a cupola bulge in the side of the turret. From January 1943, however, Panthers appeared with all the design improvements suggested from trials with the pilot model. The glacis plate thickness was increased to 80 mm., the bored out HL 230 engine was fitted together with the new AK 7-200 gearbox, as already described, which allowed single radius turns (i.e., a definite fixed radius of turn depending on the gear engaged) and also made a neutral turn possible with the vehicle stationary. To simplify turret production, the cupola was shifted slightly to the right, thus eliminating the bulged housing.

This first full production type was designated PzKpfw V Ausf D. No record has been unearthed of an Ausf C model, but it seems almost certain that this was a "paper project", like the Ausf B with some other proposed mechanical change. Much confusion has always existed over the designations of these early Panthers, mainly because the Germans themselves

A remarkable view of a burning Panther Ausf A, photographed through the driver's visor of the approaching SU-85 which had just knocked it out, Russian Front, winter 1944. (IWM)



The Panther's biggest adversary in the Normandy fighting was the rocket-firing fighter, (notably the Typhoon) which more than made up for the Allies lack of tanks able to meet the German tanks on equal terms. This Panther A is shown soon after a rocket attack. (IWM)



Determined stalking could pay off, even for the infantry. Here a platoon of US infantrymen rush forward to capture a Panther which has just been immobilized by two quick shots at point-blank range from the bazooka crew in the foreground. Normandy, July 26, 1944. (IWM)

later classed the early Ausf A vehicles with the full production Ausf Ds for record purposes. Early in 1943 they confused the record further by identifying the original Ausf A as the "Ausf D₁" and the Ausf D as the "Ausf D₂".

Characteristics of the Ausf D were the "dustbin" cupola, the vision port and machine-gun port on the glacis, smoke dischargers on the turret sides, and a straight edge to the lower sponson sides with separate stowage compartments fabricated beneath the rear ends. On later Ausf Ds the improved type of cupola was fitted and the smoke dischargers were dropped in favour of a bomb thrower installed in the turret roof and operated by the loader. Later Ausf Ds also had the skirt armour, which was adopted as standard to protect the top run of the tracks from "bazooka" hits, and Zimmerit anti-magnetic paste covering to prevent the attachment of mines. All except the earliest vehicles had the L/70 gun with double baffle.

Next production model of the Panther was designated Ausf A, an anomaly which has not been fully explained. It has been suggested that this out-of-sequence designation was deliberately adopted to



US infantry cautiously approach a burning Panther which has just been savaged by a rocket attack from fighters, Normandy, June 1944. (US Official)

confuse the Allies but this seems most unlikely. It may conceivably have resulted from an early administrative, phonetic, or clerical error, since the logical designation was Ausf E. Be that as it may, the Ausf A appeared in the latter half of 1943 and featured several detail improvements. Chief among these was the adoption of the new cupola with armoured periscopes, and the provision of a proper ball-mount for the hull machine-gun. Side skirts of 5 mm. armour and a Zimmerit finish were standard. The side skirts, incidentally, were only loosely fixed by bolts and they were frequently removed, either by the crew or by adjacent foliage in combat conditions. The gunner's binocular sight was replaced by a monocular one, though this was not noticeable externally. To further simplify turret production, however, the pistol port and the small loading hatch featured in the Ausf D were eliminated completely, leaving just the big loading/escape hatch in the turret rear. The Panther Ausf A was the main type encountered by the Allies in the Normandy fighting.

The final production model of the Panther in its original form was also in action in Normandy in June 1944. This was the Ausf G. By this time, incidentally, the designation PzKpfw V had been dropped following a personal directive from Hitler on February 27, 1944, and the vehicle was simply known as the Panther Ausf G. Considerable modifications featured in this vehicle. The superstructure sides were altered, mainly to simplify production, so that the rear stowage compartments were now integral with the hull instead of separate additions. This gave a sloping lower edge to the sponsons. The hull sides were at the same time increased in thickness from 40 mm. to 50 mm. with the angle of slope altered from 30° to 40°. The driver's vision port was eliminated from the glacis plate and his vision was greatly improved by provision of a rotating periscope in place of the episcopes. New hinged hatches with spring-assisted opening replaced the original hatches provided in the hull roof for the driver and wireless operator. The earlier models had pivoted hatches which were found

The Beobachtungspanzer Panther (Sd Kfz 172) was an old Panther D converted as an OP vehicle or command vehicle for SP artillery battalions. The "gun" was a wooden dummy and main armament (for self-defence) was the ball-mounted machine-gun. (IWM)



The Befehlspanzer Panther was a standard vehicle (in this case an Ausf D) fitted with extra radio for the use of unit commanders. It was distinguished by the extra aerials. (IWM)





This Panther Ausf G ("Cuckoo") was captured by 4th Tank Battalion, Coldstream Guards, and used in action by them in January 1945. (IWM)

to jam easily. Internally, armoured ammunition bins were fitted inside each sponson with sliding armoured doors to reduce fire risk. The 7.5 cm. ammunition stowage was also slightly increased in this model from 79 to 82 rounds.

Some amendments were made to external stowage, including the provision of a stronger method of attaching the skirt armour. In very late production vehicles the cylindrical stowage box for the gun pull-

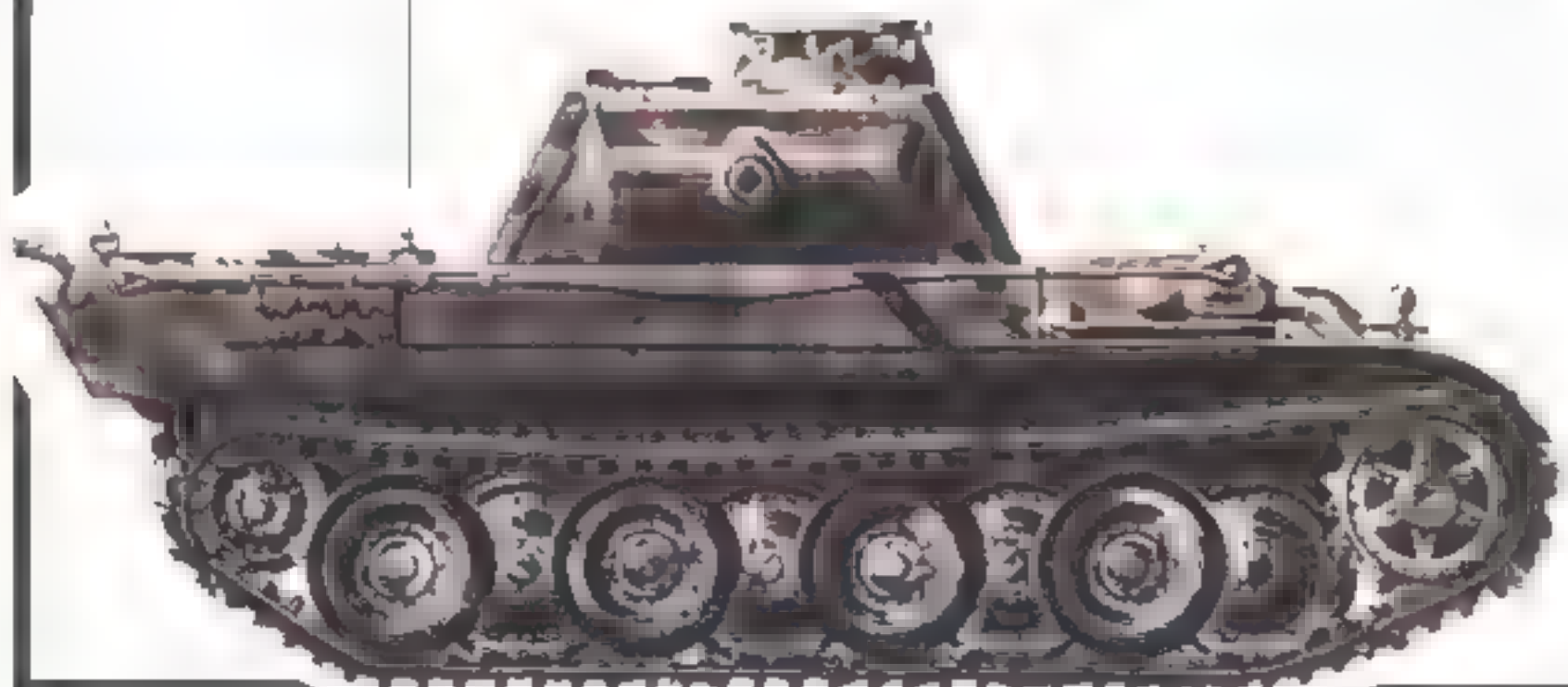
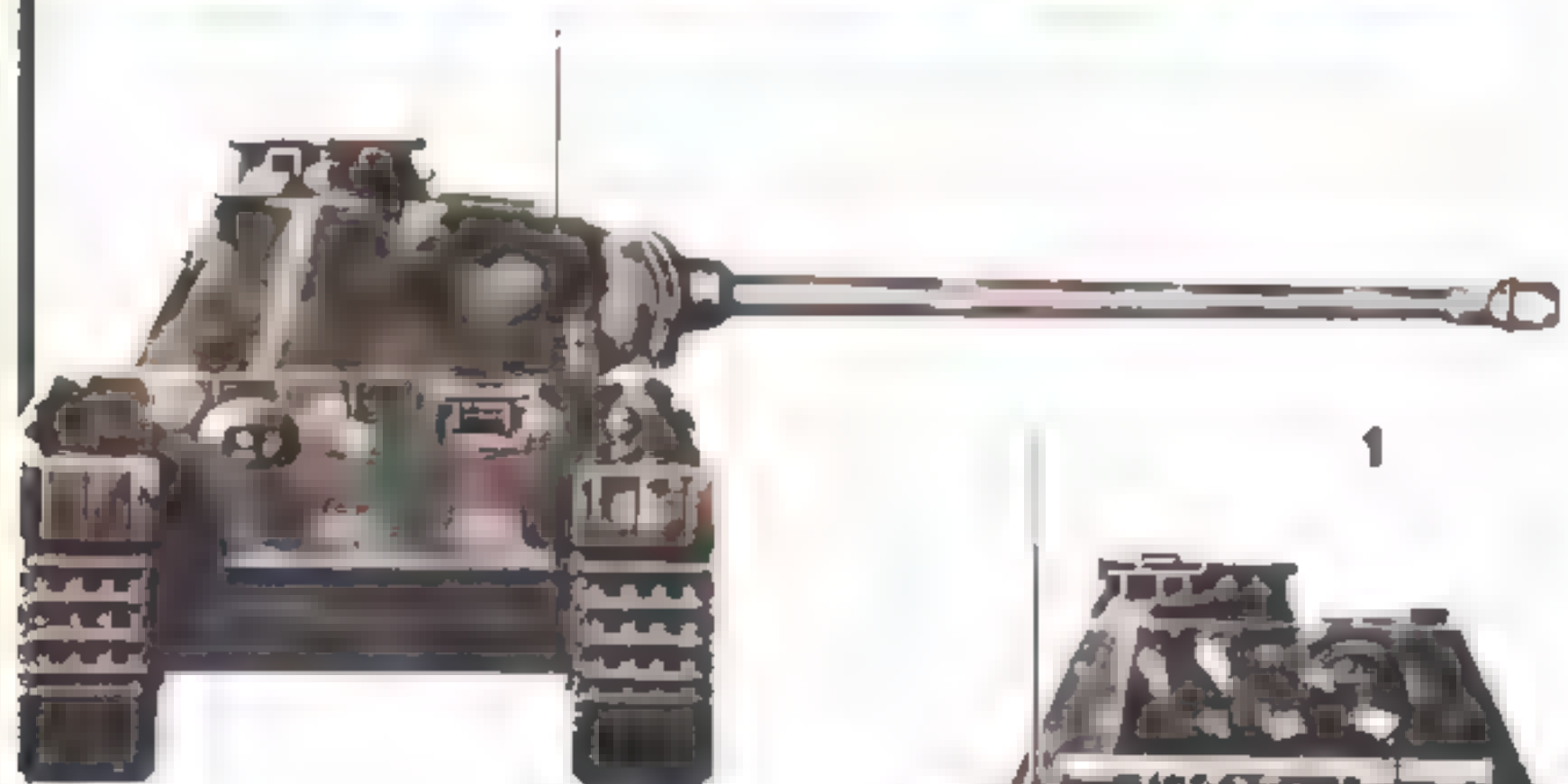
through and cleaning gear was removed from the left side of the hull and mounted across the hull at the rear of the engine compartment.

THE PANTHER II

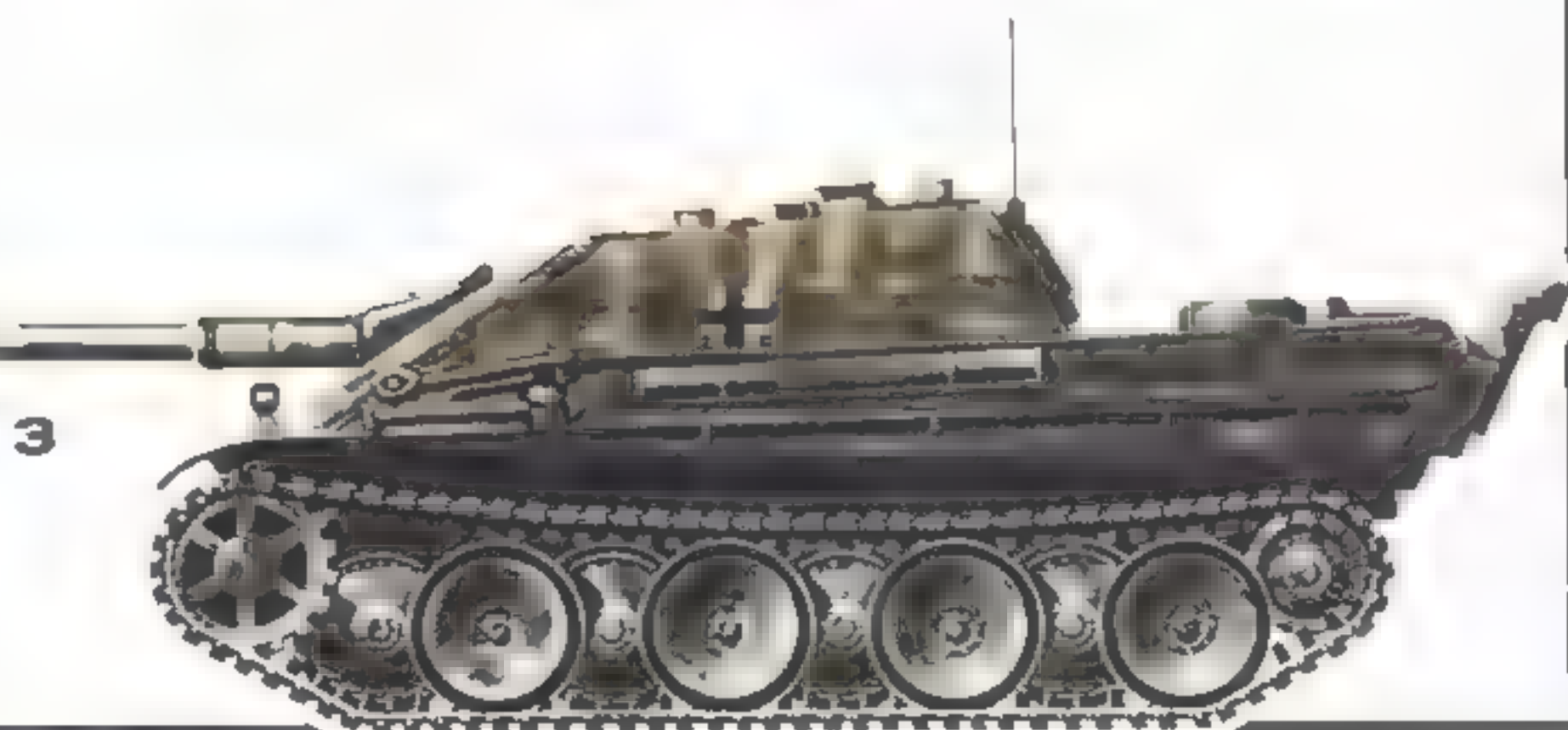
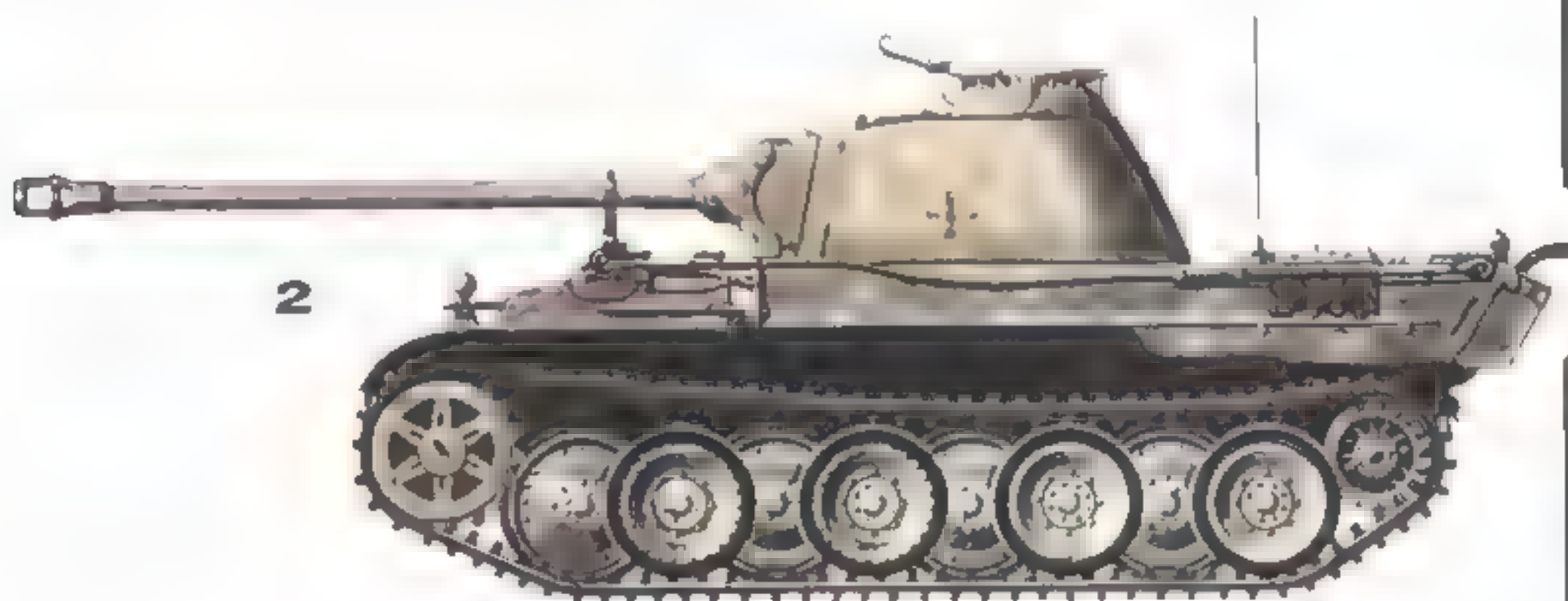
With Tiger and Panther production under way, a new generation of tanks was planned which was to incorporate the lessons from existing designs. In particular,

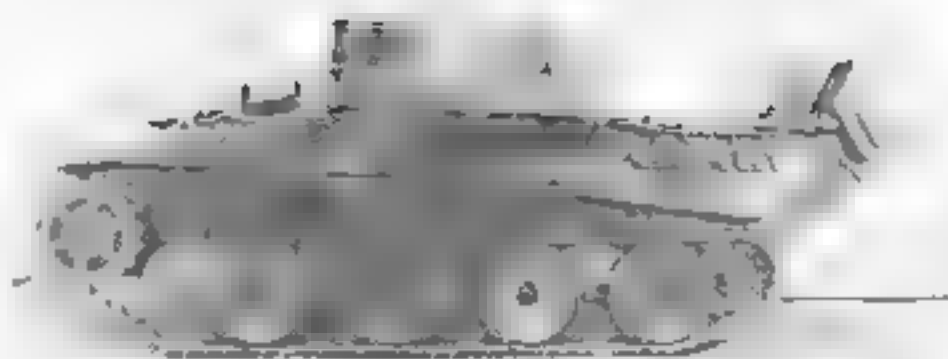
"Battle of the Bulge" in December 1944 was the last big armour offensive by the Germans on the Western Front. This Panther Ausf G was successfully stalked and "brewed up" by a flank shot from a Sherman on the road between Wirtzfeld and Krinkel. (US Official)





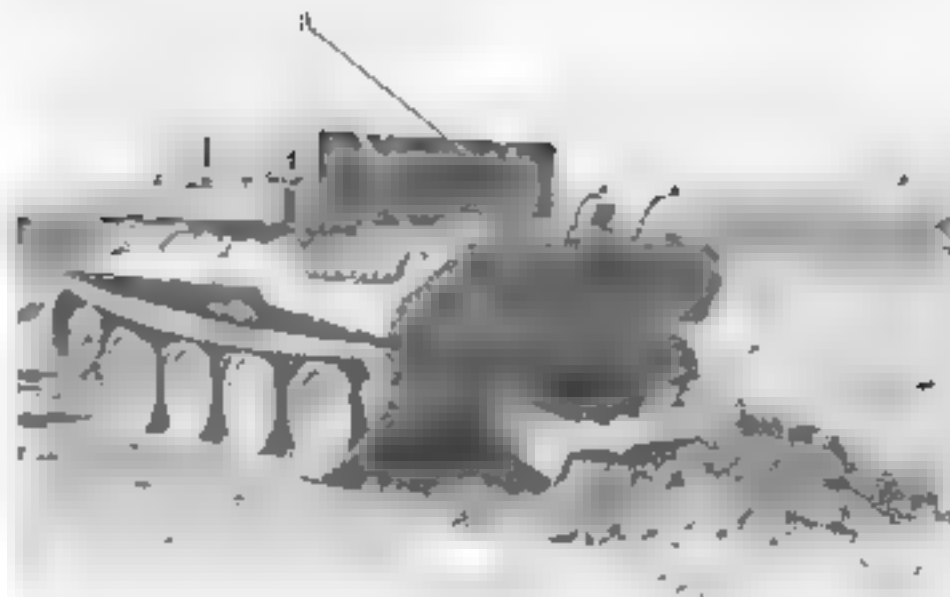
- 1 Panther Ausf G in one of the camouflage colour schemes used in Normandy (top and bottom). For comparison centre drawings show Ausf A in same colour scheme
- 2 Panther Ausf A in snow-camouflage on the Russian front
- 3 Jagd Panther was first encountered by British troops at dusk on July 30, 1944, in Normandy south of Caumont on Hill 309 ("Coldstream Hill") when it knocked out several Churchills of 4th Tank Bn. Coldstream Guards, 6th Guards Tank Brigade, during the fighting for the break-out. The Coldstreams captured the hill and held it for some hours without infantry support





Above and Right: The Bergepanzer Panther (Panther AR) was an important special purpose type with winch and recovery gear. The earth anchor was raised and lowered from the winch. The light jib could be erected either side for lifting components.

(IWM)

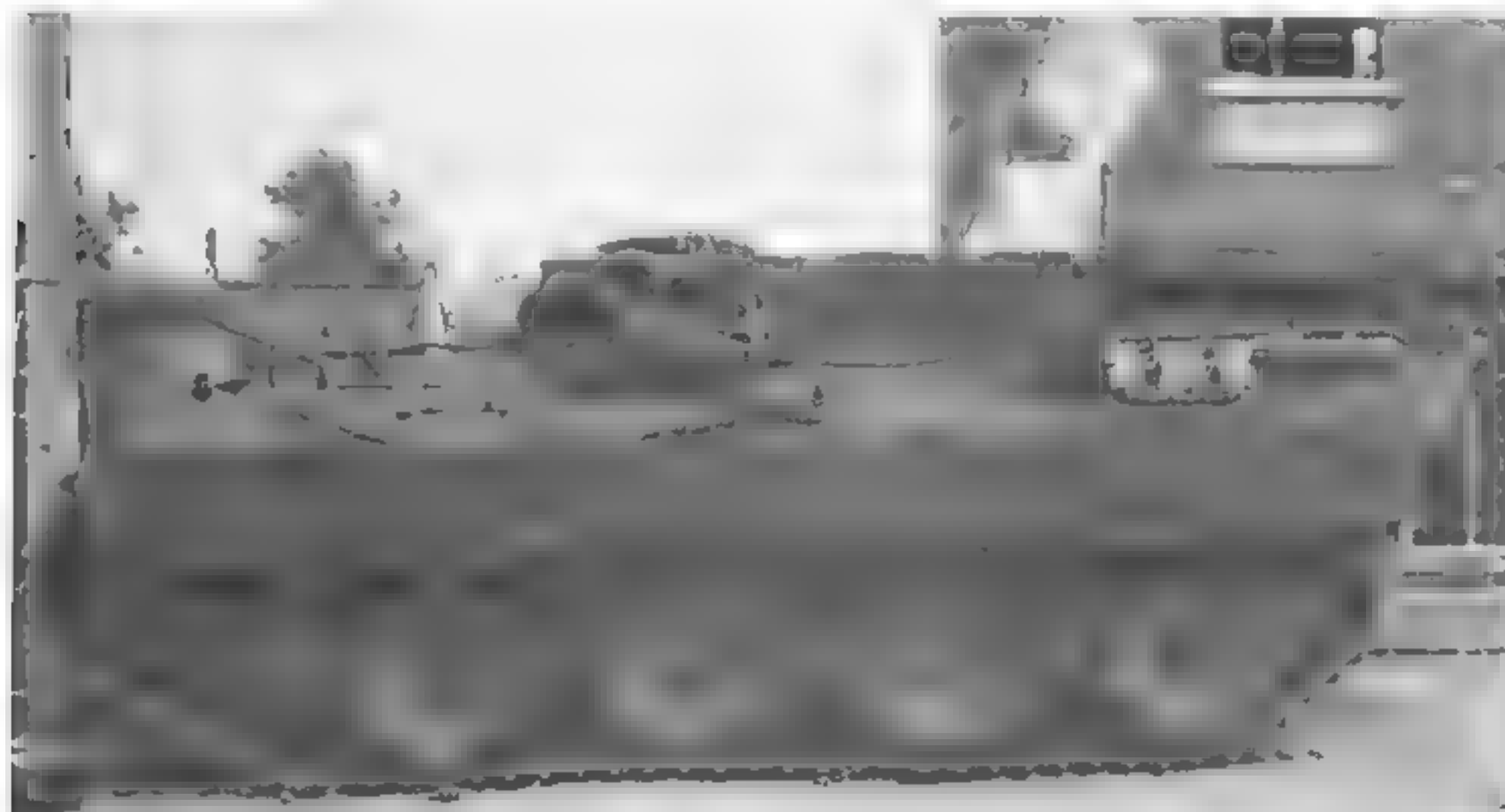


attention was to be given to simplifying production, economizing on materials, reducing maintenance, and standardizing components as far as possible. In February 1943 Waffenprüfamt 6 asked MAN and Henschel to produce improved designs for the Panther and Tiger respectively, ensuring maximum interchangeability of parts. Henschel produced the Tiger II which went into production at the end of 1943 since a replacement for the somewhat unsatisfactory Tiger was urgently needed. The improved Panther, the Panther II, officially designated Panther Ausf F, was to have a hull similar to the existing Panther but with the same form of interleaved all-steel resilient wheels as the Tiger II. Other changes were to be the adoption of an improved gearbox and transmission, the AK 7-400, and mechanical parts such as brakes identical to those in the Tiger II. The armour on the hull top was to be doubled to 25 mm. and the ball-mount was to be altered to take the MG 42. The

major change, however, was to be a new design of turret, known as the Panzerturm Schmal (small), which, as its name implies, was much smaller than the original Panther turret. The object was to reduce weight, simplify production, reduce frontal area, eliminate shot traps beneath the mantlet (a weakness in the original Panther turret) and enable a larger gun to be fitted. It was to have a built-in stereoscopic rangefinder, and a gyrostabilizer for both the sight and the gun based on that fitted in American tanks. As part of the experimental work for this a standard Panther was fitted with a gyrostabilizer for firing trials and proved to have its accuracy and effectiveness doubled.

The new small turret was developed as a separate project by Daimler-Benz under the direction of Dr. Wunderlich, assisted by Col Henrici, a gunnery expert from Waffenprüfamt 6. Kniepkampf was in overall charge of both the Tiger II and Panther II

Not all Bergepanthers were fitted with earth spades. They were used as towing vehicles only. Others had the winch removed and were used as munitions carriers. (IWM)





A very early production Jagdpanther (possibly, indeed, the prototype) showing the one-piece 8.8 cm. barrel which characterized early models. The unusual twin vision port for the driver supports the view that this is the prototype vehicle.
(Chamberlain Collection)

projects. The new turret proved a most successful design. It had the same ring diameter as the old turret, but took 30% less time to make and had 30% more armour plate all within the same weight limit. It could take the L/70 gun and was also designed to accommodate a proposed lengthened L/100 version of the same weapon. It could take the same 8.8 cm. gun as the Tiger II as yet another alternative. The wide mantlet, difficult to manufacture, which characterized the old turret, was replaced by a relatively simple Saukopf (pig's head) mantlet, of conical shape as its description implies. The turret was ready before the Panther II, but though running prototypes of this vehicle were produced in 1944, the rapidly deteriorating conditions of the war with facilities curtailed and the need for continued supply of types already proven meant that the Panther II, or Ausf F, never went into production and there was thus no chance for this fine design, virtually a perfected version of the original Panther, to prove its mettle. It would have undoubtedly been a much more useful and potent weapon than the very heavy and bulky Tiger II.

Final production models of the Panther Ausf G did, in fact, incorporate one feature intended for the Ausf F. This was the all-steel resilient road wheel which replaced the rubber tyred type and became standard for late-production Tigers as well as the Tiger II. It is apposite also to mention here the engine improvements which were gradually introduced for the Maybach HL 230 motor. Over-heating had been

a problem at the start, as previously mentioned. This was overcome by fitting a second cooling pump, modifying the coolant distribution, and improving the bearings and cylinder head seal. Later Panthers, therefore, proved very much more reliable than the early vehicles involved in the Kursk debacle. To increase the power of the HL 230 for the Tiger II and Panther II it was proposed to increase the compression ratio and incorporate fuel injection and, later, superchargers. Though modified prototypes were built and tested, the war had ended before the up-rated engine could go into production.

OTHER PANTHER PROJECTS

By late 1944, several advanced projects based on the Panther chassis were in the design stage. Of these the most important were an AA tank, a Waffenträger, a minesweeper tank, and a dozer tank. For the Panther II chassis a Panzerjäger SP variant was proposed incorporating a 12.8 cm. gun, the largest possible weapon which could be fitted on the chassis. Because of the war situation, however, few of these projects got beyond the mock-up stage, though the Waffenträger existed as a single prototype. A further development associated with the Panther which did see service was infra-red night-fighting equipment. A number of Panthers were actually fitted experimentally with infra-red sights and these operated in conjunction with a 60 cm. infra-red searchlight carried on an

Below and Right: Views of a standard early production Jagdpanther with no row cast door round mantlet, and one piece gun barrel. Note the moving arc on the roof and slot for the sighting telescope.
(IWM)



accompanying half-track vehicle called the Uhu (Eagle Owl). The Uhu could "illuminate" targets at 1000 metres and the Panther could pick out this target on closing to 500 metres.

PANTHER VARIANTS

There were several special purpose conversions of the Panther, two of these for the command rôle. For unit commanders the Befehlspanzer Panther was produced. These were simply versions of either the Ausf D, A or G fitted with extra radio equipment and the associated aerials. A second wireless receiver and transmitter were fitted to the inside right wall of the turret and the loader acted as operator. There were two externally similar models, differing only in the radio installation. The Sd Kfz 267 had Fu 5 and Fu 8 equipment, while the Sd Kfz 268 had Fu 5 and Fu 7.* In each case ammunition stowage was reduced to 64 75 cm rounds. Befehlspanzer Panthers were used by regimental and battalion command and staff officers and could only be distinguished externally by the extra aerials (or the call sign number when this was visible).

* Fu 5 was the standard German tank wireless for short-range communication within tank regiments and battalions on RT or MCW transmission. Fu 7 was the standard air co-operation set and Fu 8 was the set used for main divisional nets. (Fu Funk radio.)

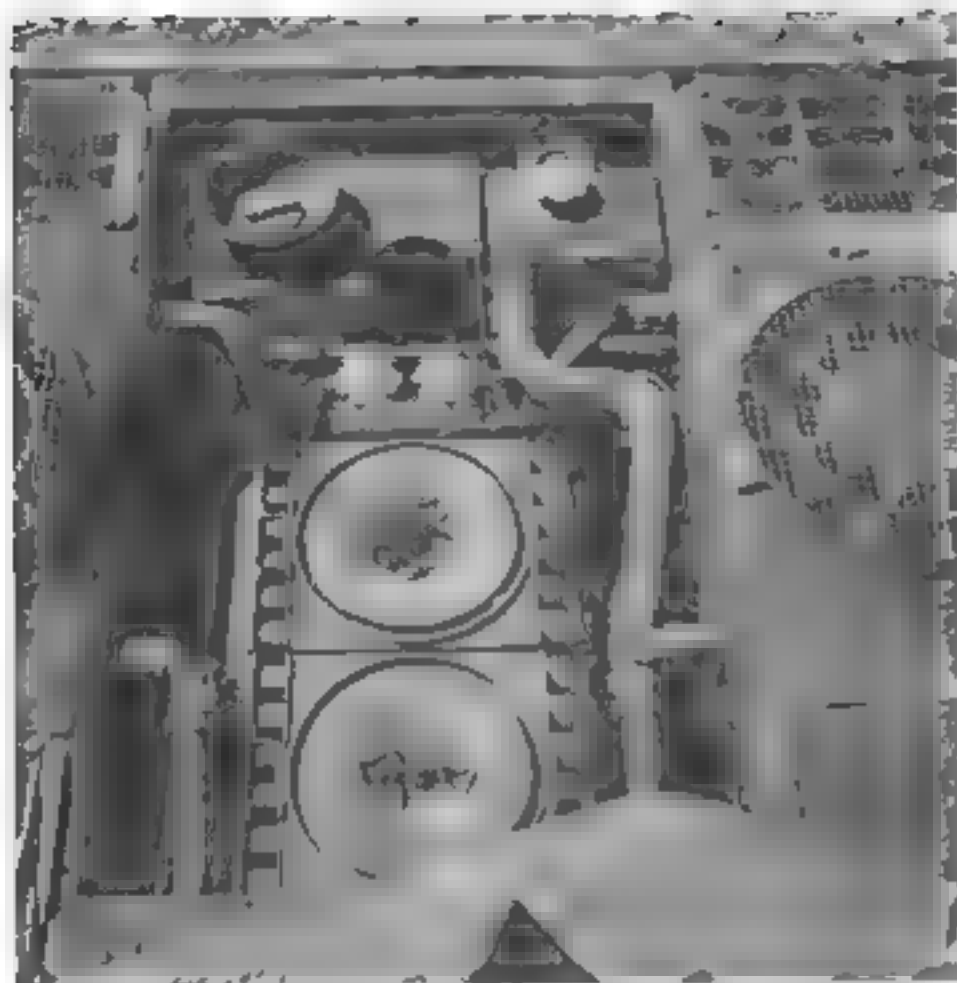


Close up of a Panther Ausf D glacis plate shows the driver's vision port (closed), the machine-gun flap, the episcopes housings on the front decking, the mortised welded joints and the chassis number painted above the right dustguard. (IWM)

The Beobachtungspanzer Panther (Sd Kfz 172) was an old Ausf D converted as an OP vehicle for observation officers, commanders, and staff officers of SP artillery regiments. The gun was replaced by a short wooden dummy, the turret was fixed in place, extra

First time in action in the Kursk battle - a main Panther Ausf D was captured through mechanical failure. Here Soviet troops examine such abandoned vehicle. (IWM)





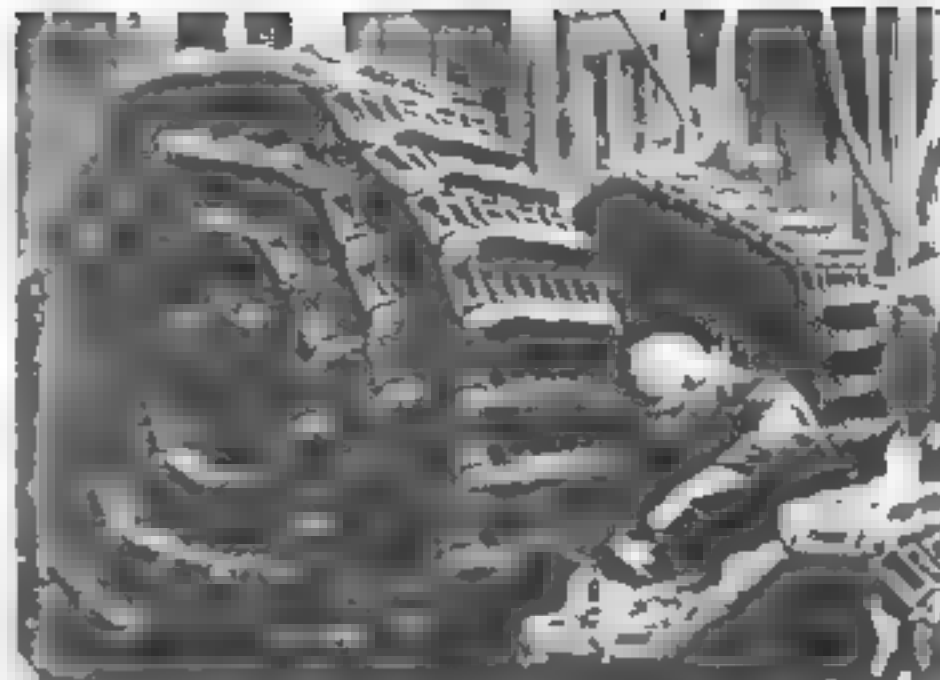
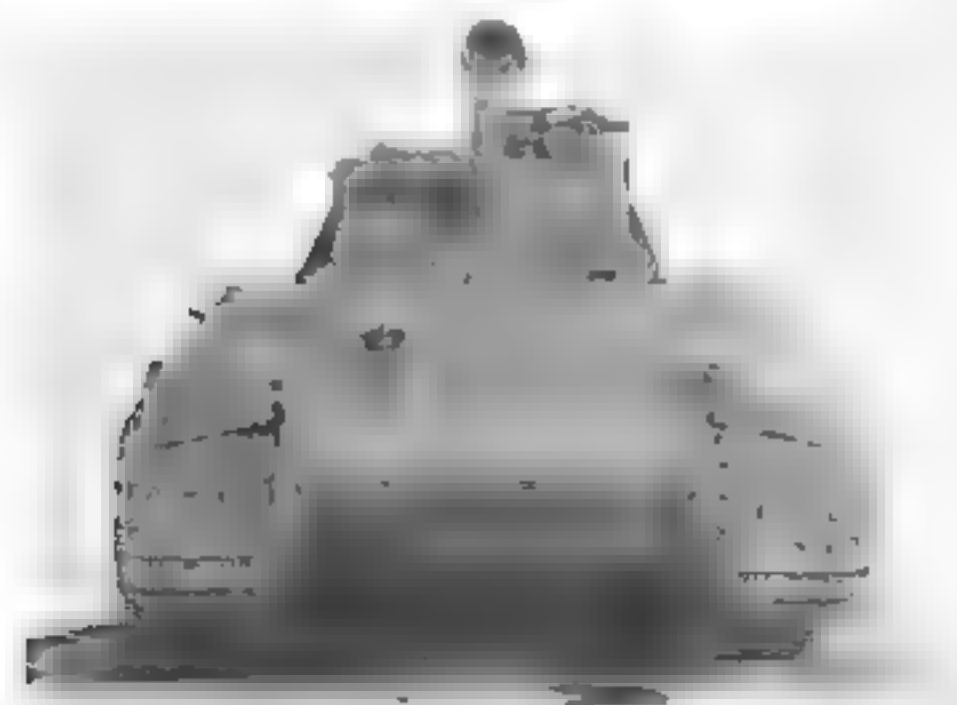
Engine installation in a Panther and a close view of the V-12 Maybach HL 230 engine. (IWM)

wireless was fitted, and a map table was added inside the turret. A ball-mounted MG 34 in the turret front was the only armament.

Finally there was the Bergepanzer Panther (also known as the Bergepanther), designated Sd Kfz 179, which was a recovery vehicle specially for work with tanks in the 45 ton class. The Bergepanther replaced the 18 ton half-track in the heavy recovery role, since it took up to three of these vehicles to move heavy tanks like the Tiger or Panther. The Bergepanther was an old Ausf D model converted by the removal of the turret and the fighting equipment. A movable winch and winch motor were installed in the fighting compartment. A limited superstructure was provided round the former turret opening consisting of heavy wood cladding over mild steel framing. A canvas tilt could cover the complete compartment in inclement weather. An "A" frame was fitted over the

This front view of a final production type Panther Ausf G shows clearly the simplified hull shape with a continuous sloping line to the lower sponson edges and the rotating periscope.

(IWM)



The Panther's tracks, heavily ribbed specially for running on ice, had 86 shoes on each side.

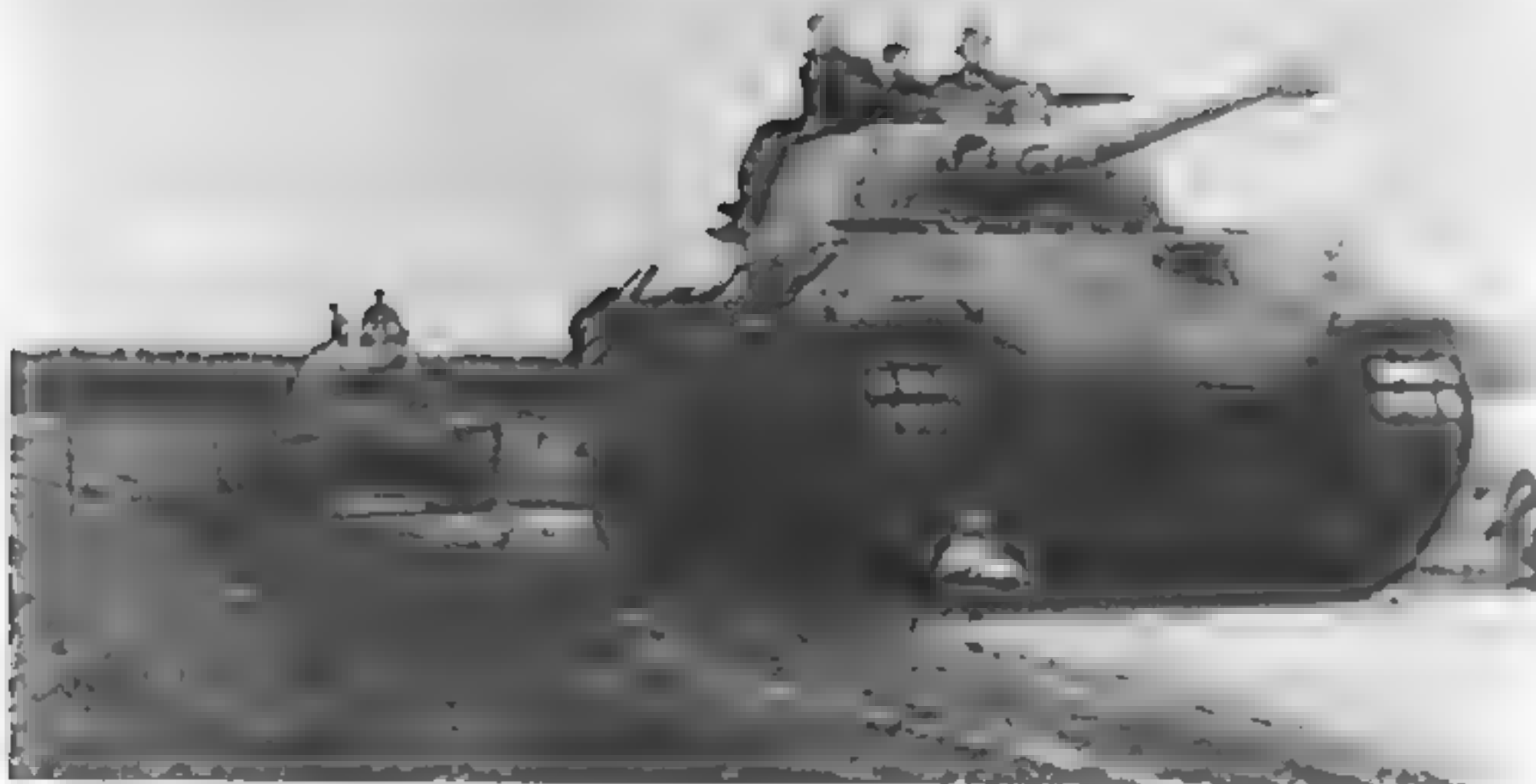


The radius arms from the axles were attached to the torsion bars running across the hull floor. In this view can also be seen the anchorage points for the alternate torsion bars from the opposite axles. (IWM)

rear decking and this supported a towing eye and towing rollers. A heavy earth spade was hinged on the hull rear and was raised and lowered from the vehicle's winch. There was a light demountable jib which could be erected either side for lifting work and there was either a MG 34 or 2 cm. cannon for air defence, mounted as required. Design and conversion of the Bergepanther was carried out by Demag and 297 vehicles were so altered. Not all of these were fitted with earth spades, however, and these were used as towing vehicles. Some of the Bergepanthers without spades later had their winches removed and were used as munitions carriers. Some other old Panthers simply had their turrets removed and were also used as munitions carriers.

THE JAGDPANTHER

The most important derivative of the Panther, however, was the famous Jagdpanther, one of the best-known AFVs to appear in World War II. The Germans built several important items of self-propelled artillery equipment as assault gun or tank destroyers but invariably these were makeshift adaptations on obsolescent, if not obsolete, chassis.



The need for a fast, up-to-date tank destroyer on a modern chassis was met by adapting the Panther. Previous attempts to produce a heavy tank destroyer had been largely unsuccessful. The 8.8 cm. Pak had been mounted on the Porsche Tiger chassis (to make the Ferdinand) and on the PzKpfw III, IV chassis as the Nashorn, but both of these improvisations proved unsatisfactory as the Ferdinand was too heavy and the Nashorn too small and underpowered. By 1943, however, there was an urgent need for tank destroyers in quantity so it was decided to utilize the best available chassis, that of the Panther. MIAG were asked to work out the design and the prototype was first demonstrated, in the presence of Hitler, on October 20, 1943. The Panther chassis was used unaltered, but the front and upper side plates were extended upwards to make a well-sloped enclosed superstructure. The mantlet was fitted in the centre of the hull front with a limited traverse for the 8.8 cm Pak 43/3 L/71 gun of 11° each side. Armour was 80 mm. in front and 60 mm. at the sides. A ball-mounted MG 34 was fitted in the right front and the

driver sat in the usual position in the left front. Sighting equipment consisted of a rangefinder and periscope telescope. The telescope protruded through

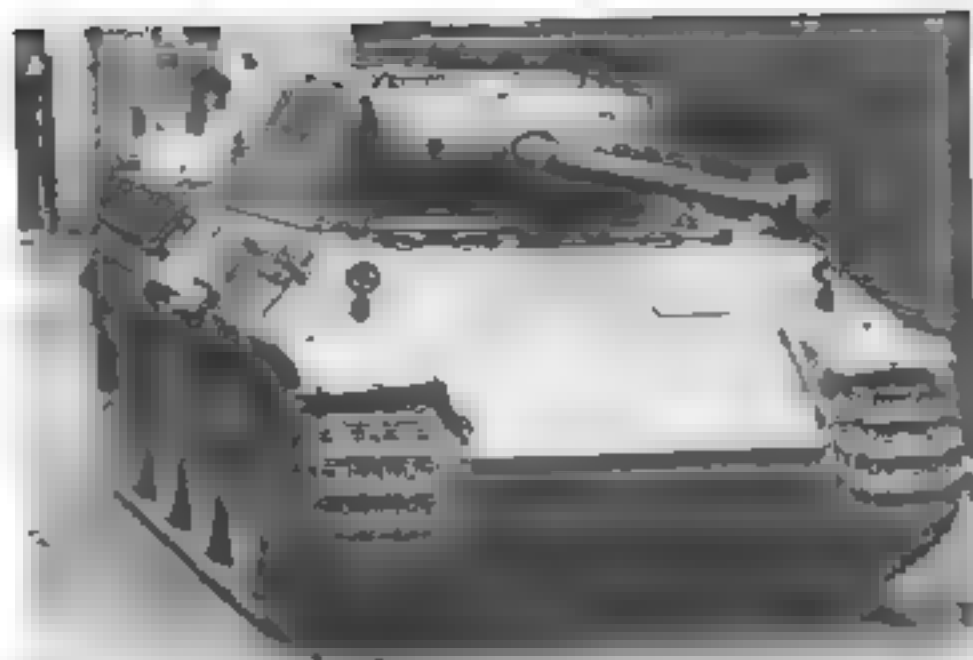


These three illustrations show the later production Jagdpanther with the two-piece barrel of the later 8.8 cm. gun. This simplified barrel changing. Note the Zimmerit anti-magnetic paste and the side skirts.
(Chamberlain Collection)





8.8 cm. gun breech, driver's seat (left), and telescope sight (top left) inside a Jagdpanther. (IWM)



A later production Panther Ausf D which shows the dustbin-type cupola and the vision port and machine-gun port on the glacis (Chamberlain Collection)



a slot in the roof within an armoured quadrant arc linked to the gun mount

The new SP version of the Panther was at first designated 8.8 cm. Pak 43/3 auf Panzerjäger Panther (Sd Kfz 173) but at Hitler's personal suggestion in February 1944 it was redesignated simply as the Jagdpanther (Hunting Panther)

Top facing page, and below, Panther Ausf D's on the Russian Front in 1944. Note how the spare bogie wheels are carried on the hull side. Panthers on the other fronts rarely carried these since they were not subject to such a vast amount of long-distance running as those in Russia (IWM)

The Panther II was to be an improved design with as many parts as possible standardized with the Tiger II. It did not go into production, but the new turret—Panzerium Schmal—was built in prototype form. It was smaller and lighter than the original Panther turret and could take an 8 cm. gun (IWM)



MIAG commenced building Jagdpanthers in February 1944, using the Ausf G chassis which had by then become the current production type. By the war's end 382 had been completed. The only mechanical change compared with the Panther tank was the provision of the AK 7-400 gearbox as was also earmarked for use in the Panther II. First production Jagdpanthers had a one-piece barrel, but later a two-piece barrel was used on the 8.8 cm. weapon to ease barrel changing (the barrel did not wear uniformly and it was economical to make it in two corresponding parts). Very late Jagdpanthers had a simplified collar round the mantlet which was of thicker bolted construction. As already mentioned, a project existed for a Panzerjäger version of the Panther II with 12.8 cm. gun, this being drawn up in late 1944 but built only as a wooden mock-up.

Crew of the Jagdpanther consisted of a commander, gunner, two loaders, wireless operator/machine-gunner and driver. The vehicle carried 60 8.8 cm. rounds. The Jagdpanther was the best and most potent of all the German tank destroyers. It was well-shaped, low, fast, and heavily armoured. It was intended to build Jagdpanthers at a rate of 150 per month, but disrupted production facilities in the last year of the war made this target quite impossible to achieve.

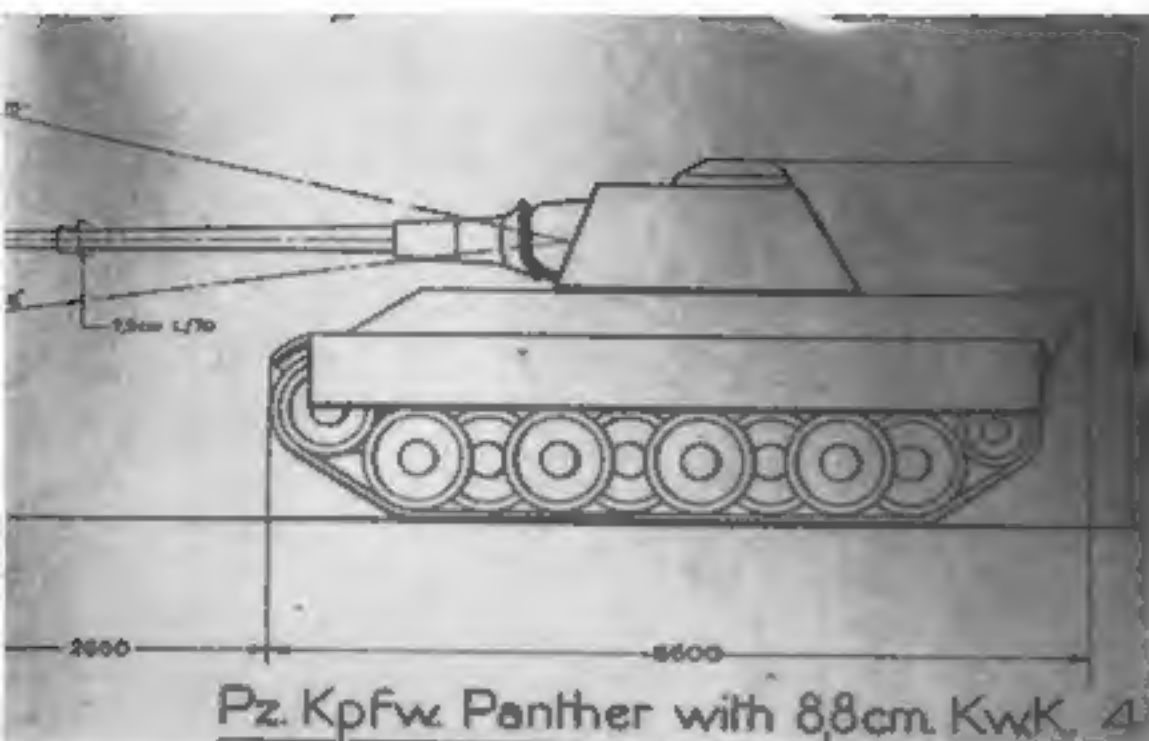
Had the war dragged on (and had Germany been able to maintain its planned production programme unhindered), the Panther, Panther II, and Jagdpanther would have become the backbone of the German panzer divisions (together with the Tiger II and Jagdtiger in lesser numbers), and from late 1944 a rationalization programme was introduced (Richtwert-Programm IV) which terminated production of all earlier types in favour of the "new generation"



A rear view of an early production Jagdpanther which shows the large escape hatch and the small hatch for re-ammunitioning and discarding empty cases.
(IWM)

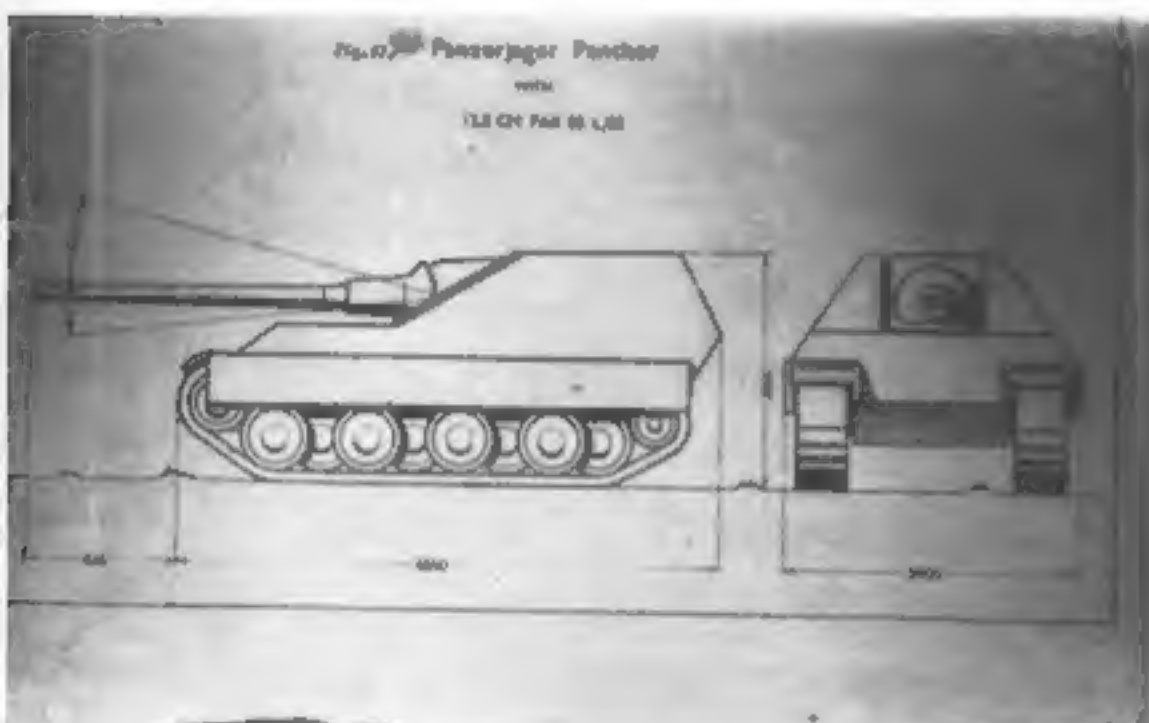
The visit of Colonel Ishide and the Japanese Military Attachés to examine a Panther and Tiger. Japan later bought one of each as recounted in the text.
(IWM)





The project drawing for the Panther II design which was to mount the small turret with either a 7.5 cm. or 8.8 cm. gun. Suspension and other components were interchangeable with the Tiger II. (IWM)

Project drawing dated November 17, 1944, for the proposed Panzerjäger Panther with 12.8 cm. gun. This would have been on the Panther II chassis. Only a wooden mock-up was completed before hostilities ceased. (IWM)



Final production model of the Jagdpanther had a wider, squarer collar which was bolted in place to simplify production. (IWM)



vehicles. The other type to be included in the new programme was a family of Waffenträger and SP types developed on a light chassis adapted from the Czech-built RzKpfw 38(t) (and its German-developed derivative, the 38(d)). However, cessation of hostilities in May 1945 brought the Panther story to a swift and premature close with much of the potential of the design still unrealized. A few Panthers served on for a number of years post-war, however, but in the French Army which equipped some units with captured vehicles. The other victorious nations each took a few Panthers for trials. The British actually built at least one Panther in 1946, using spare and cannibalized parts to assemble a "new" vehicle which was used in comparative trials with the Black Prince and Centurion.

An interesting "clandestine" use of the Panther took place during the last desperate German offensive in the West, the so-called "Battle of the Bulge." Here at least ten, probably more, Panthers were effectively disguised and marked to resemble U.S. Army M-10 tank destroyers. The cupola was removed, together with the external stowage boxes on the hull. The turret and nose were then disguised with thin sheet metal to resemble the shape of the M-10, including the distinctive rear overhang of that vehicle's turret counterweight. Despite being finished in very convincing U.S. markings, the phoney M-10s enjoyed little success largely because the subtlety of the idea was nullified by the general confusion prevailing at the time.

One final little-known aspect of the Panther story is that Japan actually purchased one of these vehicles with a view to producing licence-built versions for use in the Pacific. Colonel Ishide, an AFV specialist with the Japanese Military Mission to Germany, witnessed a demonstration of both a Tiger I and a Panther at the Henschel works on July 30, 1943. As a result the Japanese purchased one sample of each vehicle with the intention of shipping them to Japan for further trials and probable production of their own versions. This transaction took place in November 1944 when a Tiger and Panther were formally handed over to the Japanese Mission in Germany. However, by this time there was no means of getting these vehicles safely to Japan and as far as is known they never actually left Germany. Had the war been prolonged, the Nipponese Panther might well have been yet another chapter in the history of this classic tank, and surely no less interesting.

A.F.V. Series Editor: DUNCAN CROW

SPECIFICATIONS: Pz. Kpfw. V PANTHER (Sd. Kfz. 171)

Data	Model D (Ausf D)	Model A (Ausf A)	Model G (Ausf G)	A.R.V. (Bergepanther)	O.P. Tank (Beob. Panther)
General					
Weight (in action): tons		44 tons 15½ cwt.		42	
Crew	5	5	5	4	4
Armament					
Main		7.5 cm Kw. K.42 (L/70)		2 cm. Kw. K.38	—
7.92 mm. M.G.34 (No.):	1	3	3	1	2
Ammunition (Main armt.): (rounds)	79	79	79	—	—
Ammunition (7.92 mm.): (rounds)	2,500	4,500	4,500	—	4,500
Armour					
Turret front: (mm.)	110 at 10°	110 at 10°	110 at 10°	—	—
Turret sides: (mm.)	45 at 25°	45 at 25°	45 at 28°	—	—
Turret rear: (mm.)	45 at 28°	45 at 28°	45 at 28°	—	—
Turret roof: (mm.)	15 at 83° and 88°	15 at 83° and 88°	15 at 83° and 88°	—	—
Superstructure:					
Front: (mm.)	80 at 55°	80 at 55°	80 at 55°	80 at 50°	80 at 55°
Sides: (mm.)	40 at 40°	40 at 40°	50 at 30°	40 at 40°	40 at 40°
Rear: (mm.)	40 at 30°	40 at 30°	40 at 30°	40 at 30°	40 at 30°
Roof: (mm.)	15 horizontal	15 horizontal	40 horizontal	15 horizontal	15 horizontal
Hull front: (mm.)	80 at 55°	80 at 55°	80 at 55°	80 at 55°	80 at 55°
Hull sides: (mm.)	40 vertical	40 vertical	40 vertical	40 vertical	40 vertical
Hull rear: (mm.)	40 at 30°	40 at 30°	40 at 30°	40 at 30°	40 at 30°
Hull belly: (mm.)	20 + 13 horizontal	20 + 13 horizontal	20 + 13 horizontal	20 + 13 horizontal	20 + 13 horizontal
Engine:					
Type	Maybach HL210 P.30*	Maybach HL230 P.30	Maybach HL230 P.30	Maybach HL210 P.30 or HL230 P.30	Maybach HL210 P.30
Output at 3,000 r.p.m.: (b.h.p.)	642	690	690	642 or 690	642
Gearbox (Z.F.)		AK 7-200		AK 7-200	AK 7-200
Type:		7 forward, 1 reverse		7 F. 1 R.	7 F. 1 R.
Number of speeds:					
Steering:	Discontinuous regenerative type giving one radius of turn for each gear engaged.				
Drive:	All models front sprocket.				
Suspension:	8 stations per side, each consisting of 2 large bogie wheels and independently sprung on 2 torsion bars connected in series. Wheels overlapped and interleaved. One small return roller behind sprocket.				
Tracks:	Single link single pin type, recessed construction 4 wheel paths and twin guide horns.				
Dimensions:					
Overall length: (ft. and in.) (incl. Gun)	29' 1"	29' 1"	29' 1"	26' 9"	22' 7"
Overall width: (ft. and in.)	11' 3"	11' 3"	11' 3"	10' 9"	11' 3"
Overall height: (ft. and in.)	9' 9"	9' 9"	9' 9"	9' 0"	—
Ground clearance: (ft. and in.)	1' 10"	1' 10"	1' 10"	1' 10"	1' 10"
Track centres: (ft. and in.)	8' 7½"	8' 7½"	8' 7½"	8' 7½"	8' 7½"
Track width: (ft. and in.)	2' 1½"	2' 1½"	2' 1½"	2' 1½"	2' 1½"
Track on ground: (ft. and in.)	12' 10"	12' 10"	12' 10"	12' 10"	12' 10"
Performance:					
Max. speed (roads): (m.p.h.)	34	34	34	20	34
Max. speed (cross country): (m.p.h.)	15	15	15	10-15	15
Radius of action (roads): (miles)	105	110	110	105	105
Radius of action (cross country): (miles)	53	55	55	53	53
Gradient:	35°	35°	35°	36°	35°
Trench: (ft. and in.)	6' 3"	6' 3"	6' 3"	6' 3"	6' 3"
Step: (ft. and in.)	3' 0"	3' 0"	3' 0"	3' 0"	3' 0"
Fording depth:	4' 7"	4' 7"	4' 7"	4' 7"	4' 7"
Observation:					
Sight—main armament	T.Z.F. 12	T.Z.F. 12a	T.Z.F. 12a	—	—
Sight—subsidiary armament	—	K.Z.F. 2	K.Z.F. 2	K.Z.F. 2 (Model A)	K.Z.F. 2 (in turret)
R/F:	—	—	—	—	Em. 1.25 m. R (Pz)
Observation periscopes:	—	—	T.S.R. 1	—	T.B.F. 2 and T.S.R. 1 or S.F.14Z
Odometer:	—	—	—	—	Blockstelle "O"
Cupola:	6 slits with glass blocks	7 episcopes	—	—	7 episcopes
Driver:	—	2 episcopes and 1 periscope	—	—	2 episcopes
Loader:	—	—	Episcopa	—	—
W/T operator:	2 episcopes and rectangular port	—	1 periscopa	2 episcopes and 1 rectangular port	—
Communication:	Fu.5 and Fu.2 OR Fu.2 only			—	Fu. Sprech. "f" and receiver M. W.E. "e"

*Model D₁ (original Ausf A) only; D₂ had HL 230 engine.



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